

REMARKS

Claims 1-3 are pending in the application

Claims 1-3 were rejected

I. 35 USC §103 Claim Rejections

Claims 1-3 were rejected under 35 USC §103(a) as being unpatentable over Lei *et al.* ("Reduced Complexity Maximum Likelihood Detection For V-BLAST Systems," IEEE Military Communications Conference, 2003 MILCOM, Vol. 2, pp. 1386-1391, Oct. 2003) in view of Yakhnich *et al.* (U.S. Pub. No. 2002/0122510) and further in view of Chan *et al.* ("A Simple Taboo-Based Soft Decision Decoding Algorithm For Expander Codes," IEEE Communications Letters, Vol. 2, No. 7, pp. 183-185, July 1998). Applicant herein traverses this rejection basis and respectfully requests reconsideration thereof.

The invention here is generally directed to the application of spherical decoding for reducing the complexity of maximum likelihood decoding of composite signals received from a transmitter using multiple transmit antennas. As is known, such spherical decoders produce a series of candidate strings representing bits or symbols of the received data, with a cost function applied to the candidate strings for selecting the most likely candidate string corresponding to the received data. The Applicant points out in his Specification that a known method for applying such spherical decoding is carried out by progressively reducing the sphere search radius as candidate strings are determined and evaluated. However, as the Applicant also points out, as the search radius is reduced, the quality of the data provided by the spherical search process tends to be impaired. To address that problem, the invention operates to increase the number of candidate strings available for evaluation at a search radius by combining the set of candidate strings determined at that radius with an additional set of candidate strings constructed to be probabilistically useful to the decoding process. According to the invention, such an additional set of candidate strings is constructed by flipping one or more bits of the most likely candidate string.

With respect to the art cited against the Applicant's claims, the primary reference, Lei, teaches no more than the basic idea of using a spherical decoder to implement reduced complexity maximum likelihood detection for signals transmitted in a multiple antenna transmission environment, a teaching Applicant also acknowledged in his Specification as being known in the art. Moreover, as acknowledged in the Office Action, Lei fails to teach either the features of Applicant's invention of (1) computation of log-likelihood ratios for bit positions determined from the spherical decoding or (2) the use of a cost function based on candidate vectors constructed by flipping one or more bits of the most likely candidate vector, both of which features are included as limitations in the present claims.

The Office Action cites the Yakhnich reference as teaching the limitation of computing a log-likelihood ratio for the bit positions of a received candidate vector determined in the spherical decoding step. While the Applicant acknowledges that the cited portion of Yakhnich provides a general teaching of applying log-likelihood ratios to symbol bit positions, it is noted that Applicant has already described in his Specification the application of log-likelihood ratios to symbol bit positions as generally known in the prior art, and it is respectfully submitted that the teaching of Yakhnich adds nothing to that prior description of the current art.

With respect to the Chan reference, the Applicant respectfully submits that the only similarity between the teaching of that reference and the invention taught and claimed here is the use of the term "bit flipping" in the Chan abstract. The "bit flipping" of Chan is uniquely applied to error correction for Simple Parity Check (SPC) coding. Specifically, according to Chan, flipping the value (i.e., changing to the complimentary value) of a variable in a block of SPC coded data has the effect of flipping the "satisfied" and "unsatisfied" constraints for the variables within the block. This property is then used by Chan to selectively flip particular block variables for identifying erroneous variables in the block.

Applicant respectfully submits that Chan's teaching of complementing a variable value in blocks of SPC coded data cannot reasonably be construed as

showing or suggesting the limitation of Applicant's claims directed to the feature of increasing the number of candidate strings available for analysis at a given radius in a spherical decoder, where the additional candidate strings are constructed by flipping one or more bits of the most likely candidate vector. Moreover, it is respectfully submitted that, even if such a construction of Chan were merited, there has been no showing of a motivation to combine Chan with the other cited references in the manner of the invention here. Thus, the rejection here becomes a classic "hindsight" rejection -- *using the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention* -- an approach consistently rejected by the courts. See *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998):

The Applicant accordingly submits that the §103 rejection of the present office action cannot stand. Withdrawal of that rejection is respectfully requested.

II. Request for Interview

In the event that the Examiner, upon considering this response, determines that additional issues need resolution before the application is in condition for allowance, the Applicants request that the Examiner call their attorney, identified below (at 973 386-4237), to see if those issues can be resolved through an Examiner interview.

III. **Conclusion**

In view of the foregoing, allowance of all the claims presently in the application is respectfully requested, as is passage to issuance of the application.

Respectfully submitted,

David Garrett

By: 

John Ligon

Attorney for the Applicant

Reg. No. 35,938

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Docket Administrator (Room 2F-192)
Lucent Technologies Inc.
600-700 Mountain Avenue
Murray Hill, New Jersey 07974-0636